

The Human Side of Energy Efficiency: The Value of Training

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When pursuing energy-efficiency projects, what is the best way to proceed? It is fairly easy to demonstrate payback times for technical solutions such as installing heat economizers, back-pressure turbines, or efficient motors. Is this technical overhaul sufficient? Perhaps changes in the management structure would be a better approach? The answer is that neither is effective without the other. Unfortunately, many plant managers concentrate their efforts solely on technical improvements, ignoring the tremendous savings that can arise through low-risk, low-tech solutions such as training for proper maintenance and operation.

Plant managers may concentrate their efforts on technical innovations because these innovations have greatly improved the energy-efficiency potential of industrial processes since the 1973 oil embargo. In fact, energy intensity (energy use per unit of production) in the manufacturing sector fell steadily from 1973 to 1985, when it stabilized. Reductions in energy intensity increased again in 1993. Even so, facility managers cannot look to technical solutions for all energy use problems. In fact, many problems stem from lack of training related to system optimization or ineffective training programs. Establishing an effective, low-cost, low-tech training and maintenance program within a plant can prevent the seemingly endless cycle of fighting recurring problems. By devoting resources to solving the problems at hand, management investments in training can have a fast payback and lasting results.

Unfortunately, the value of training, not only to improving energy efficiency, but also to the bottom line, is often greatly underestimated. Training is often perceived as a cost, not an investment. The value of training beyond its contribution to plant safety is often undervalued. Investing in a training program will minimize costs, increase profit, and improve productivity and reliability. In fact, training is one of the most valuable investments a company can make. A study conducted by the American Society for Training and Development found that training investments

across all sectors could yield favorable financial returns for firms and their investors. This study found that an increase of \$680 in a firm's training expenditure per employee generates, on average, a six percentage point improvement in TSR (total shareholder return) in the following year, even after controlling for many other important factors.

Although there exists a general awareness of the benefits of training to energy efficiency, this awareness does not seem to break through the barriers managers face when trying to implement training programs. Why is this so? In many companies, energy efficiency is simply not a great concern of those controlling the funds for training. One of the largest barriers to implementing training is the underestimation of its importance, both by management and staff alike. Although training will greatly help to improve the energy efficiency of a plant, perhaps a better way to express its value is to stress the other benefits of training: safety, reliability, productivity, and the financial bottom line. All of these cost-saving measures will help to curb energy usage, even though their benefits go far beyond the immediate benefits of energy efficiency.

Perhaps the most obvious and important benefit of training is improving the safety record of a plant. For example, Weirton Steel Corp. undertook a series of training initiatives beginning in 1998, including safety-awareness training, hands-on workstation training, and certifying all plant supervisors in OSHA's General Industry Standards. As a result, recordable incidents fell 63 percent from 1997 to 2000. In addition, other intangible factors, such as attitude, improved. In 1997, only 15 percent of Weirton Steel Corp. employees surveyed believed that their own actions could protect their co-workers. In 2000, 60 percent believed this to be true.

In addition, a properly trained staff is a large part of maintaining reliable equipment, which also increases productivity. For example, in 1990, U.S. Steel embarked on a comprehensive predictive maintenance program to improve maintenance practices and lower maintenance costs. The program focused on employee involvement, training, and team activity. Misalignments of rotating equipment dropped from 15 percent in 1990 to only one percent in 1996. Success such as this led to the 1993 and 1995 National Maintenance Excellence Award for maintenance and equipment reliability.

Such an increase in reliability will no doubt lead to improvements in productivity. An example of this is the predictive maintenance program at the Fletcher Challenge Canada's Crofton (British Columbia) pulp mill. The Crofton mill embarked on a preventative maintenance program by creating a full-time maintenance systems specialist position and a team of hourly employees to build the preventative maintenance process. This team was trained through both classroom and field sessions. The sessions covered the tools and techniques necessary to perform the inspections, as well as *why* the inspections were necessary and what the benefits were from doing them. In just two years, the team met its goal of a 30 percent reduction in lost production due to breakdowns from the base year, translating into \$3.54 million (Canadian) per year.

Lastly, training greatly impacts the bottom line. For instance, ICI, a British chemicals company, invested £100,000 (1992 prices) for direct training costs, including training, employment of a full-time energy manager, and revenue expenditure on repairs and minor improvements. The result was a savings of over £500,000 (1992 prices) per year, an astounding ten-week payback period. In another example, a recently trained Hallmark Canada employee used his knowledge to develop an energy efficiency project resulting in \$32,000 (Canadian) savings per year—a 1.6 year payback for the cost of the project.

Obviously, there are many benefits to training – increased safety, reliability, productivity, and cost-savings for companies. Unfortunately, the message of training for energy efficiency is often overlooked when implementing a training program. It is important to extrapolate the benefits of any energy efficiency improvements to other areas of the company. For instance, training staff to implement a steam trap maintenance program will increase the efficiency of a steam system—but more importantly, it will save the company money through increased reliability and productivity of the system.

In order to implement a successful training program, managers must be committed, proactive, and supportive, both attitudinally and financially. The rewards are great for this kind of support. Successful training reduces accidents, improves reliability, and improves efficiency, productivity, and the bottom line. Training must be treated as a fundamental requirement of comprehensive management.